Ro214

Options for the Logic Scope's PM3542 & PM3543

- RS232C SERIAL AND AUDIO CASSETTE INTERFACE PM8842/20 AND PM8843/20
- RS232C SERIAL AND AUDIO CASSETTE INTERFACE AND DISASSEMBLY PACKAGE PM8842/60 AND PM8843/60

Operating manual

9499 500 10711
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S&I
Scientific & Industrial equipment division

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Positive feedback

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We need to know what you have found to be the strong and weak points of this instrument; and we would be very interested to hear about any unusual or elegant applications you have devised for it. Some of this information can be passed on to our design and development departments; and some may be fed back to other users via our bimonthly publication **T & M News.**

May we therefore suggest that you fill in the reply card alongside and send it back to us right now. That way, you'll be helping to provide the positive feedback we need to help you!

All contributions that are published will be paid for at current rates; while as an inducement for you to fill in the reply card, we are offering a free subscription to T & M News or a free copy of Part I of our Digital Instrument Course to all who reply.

Erfahrungsaustausch

Meßgeräte müssen sich in der Praxis bewähren und die in sie gesteckten Erwartungen erfüllen; auch bei Ihnen, dem Besitzer eines Geräts aus der Serie der Philips Test- und Meßgeräte. Wir aber können T & M-Geräte nur zu Ihrer vollen Zufriedenheit herstellen, wenn wir alle Ihre Wünsche kennen.

Deshalb interessiert uns Ihre Meinung über die guten und weniger guten Eigenschaften dieses Gerätes. Außerdem suchen wir Erfahrungen über ungewöhnliche oder neue Anwendungsmöglichkeiten. Vielleicht können Sie unseren Entwicklungs- und Konstruktionsabteilungen einen guten Wink geben; vielleicht können wir Ihre Erfahrungen aber auch in unserer Publikation **Info-dienst** (nur in Deutschland) veröffentlichen, damit auch andere Anwender davon profitieren können.

Deshalb möchten wir Sie bitten, die anhängende Antwortkarte auszufüllen und an uns zurückzusenden. Damit helfen Sie uns, und wir können Ihnen helfen!

Alle veröffentlichten Beiträge werden dem üblichen Tariff entsprechend honoriert. Als Dank für das Ausfüllen der Antwortkarte bieten wir Ihnen ein Freiabonnenment auf Info-dienst (nur in Deutschland) oder ein kostenloses Exemplar von Teil I von unserem Kursus Digital Instrument.

L'intérêt du "feedback"

Vous voilà possesseur d'un instrument d'essai et de mesure Philips. Nous espérons qu'il vous donnera de nombreuses années de bons et loyaux services, mais nous voudrions attirer votre attention sur un point: ce n'est qu'avec **votre** aide que nous pouvons fournir des matériels d'essai et de mesure de toute première qualité.

Nous avons besoin de savoir quels en sont les points forts et les points faibles que vous avez découverts et nous serions très intéressés d'apprendre quelles applications inhabituelles ou élégantes vous lui avez trouvé. Certains de ces renseignements peuvent être transmis utilement à nos bureaux d'études; certains autres peuvent être communiqués à d'autres utilisateurs par l'intermédiaire de notre publication **T & M Informations** (édition française seulement en France).

C'est pourquoi nous vous serions reconnaissants de remplir la carte-réponse à côté et de nous la renvoyer. De cette façon, vous contribuerez à nous fournir le "feedback" dont nous avons besoin pour mieux vous servir!

Toutes les réponses publiées seront payées conformément aux tarifs en vigueur; pour vous inciter à remplir la carte-réponse, nous offrons un abonnement gratuit à T & M Informations ou un exemplaire gratuit de la première partie de notre cours sur les instruments numériques à tous ceux qui répondront.

Details of user: **Persönliche Angaben:** **Expéditeur:**

Company/
Firma/Société .....
Department/
Abteilung/Service .....
Street/Straße/Rue .....
Box/Postfach/Boîte Postale .....
City/Stadt/Ville .....
Country/Land/Pays .....
Name/Name/Nom .....
Phone/Telefon/Numéro de téléphone .....

Details of instruments: **Gerätedaten:** **Instrument:**

Name/Name/
Désignation .....
Type number/Typennummer/
Numéro de type .....
Serial number/Serienummer/
Numéro de série .....
Date purchased/Kaufdatum/
Date d'achat .....

What are the main applications for which you use this instrument?
Wofür verwenden Sie dieses Gerät hauptsächlich?
Quelles sont les principales utilisations auxquelles vous affectez cet instrument?
.....
.....

Please, list what you consider to be the **strong points** and the **weak points** of the instrument.
Zählen Sie bitte auf, was Ihrer Meinung nach die **guten Seiten** und was die **schwachen Stellen** dieses Geräts sind.
Veuillez énumérer ce que vous considérez être les **points forts** et les **points faibles** de l'instrument.
.....
.....
.....

Do you have any queries about the use of this instrument? If so, what?
Haben Sie irgendwelche Fragen über die Anwendung dieses Geräts? Wenn ja, welche?
Avez-vous des questions à poser sur l'emploi de l'instrument? Si oui, lesquelles?
.....
.....
.....

I have devised an interesting application for this instrument.
- ☐ I enclose a brief description (up to about 500 words) of this application
- ☐ Please send a representative to collect information about the application

Ich habe einen interessanten Verwendungszweck für dieses Gerät gefunden.
- ☐ Eine kurze Beschreibung hiervon (max. ca. 500 Wörter) erhalten Sie anliegend.
- ☐ Senden Sie bitte jemanden, der sich an Ort und Stelle über den Verwendungszweck informieren kann.

J'ai trouvé une application intéressante pour cet instrument
- ☐ Je joins une brève description (500 mots environ au maximum) de cette application.
- ☐ Veuillez envoyer un représentant à qui nous donnerons des renseignements sur l'application.

- ☐ I would like to receive **T & M News** regularly.
- ☐ Please send me Digital Instrument Course Part I.
- ☐ Ich möchte **Info-dienst** regelmäßig beziehen.
- ☐ Senden Sie mir Digital Instrument Course, Teil I.
- ☐ J'aimerai recevoir **T & M Informations** régulièrement.
- ☐ Envoyez moi la première partie du cours sur les instruments numériques.

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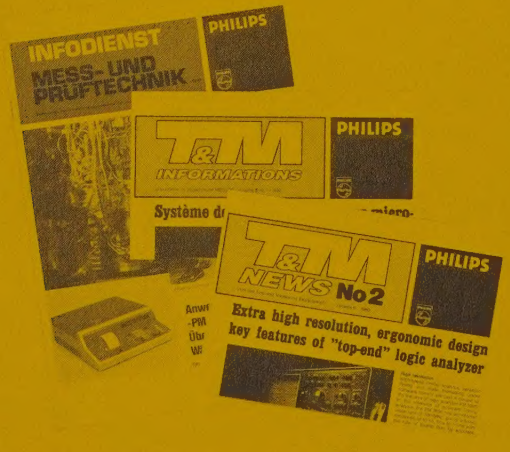
S & I TQ III - 2
Test and Measuring Instruments Department
Att. Mr. T. Sudar
EINDHOVEN
The Netherlands

please fold



T & M News is your feedback unit

T & M News is a bimonthly publication issued by the T & M Measuring Department of Philips' Science & Industry Division, for distribution to actual and potential users of Philips' T & M equipment. It provides an effective means of exchanging information in the T & M field - both from the manufacturer to the customer and **vice versa.**

Apart from **T & M News** itself, we also issue **T & M Reports,** which provide a vehicle for (generally longer) articles of a more specialized and/or theoretical nature to supplement the information given in **T & M News.** These Reports, being of a more specialized interest, are generally sent to a more restricted group of users; though anyone who is interested can obtain them on request.

One special series that was brought out in supplements to T & M News is our Digital Instrument Course (Part I: Basic binary theory and logic circuits; Part II: Digital counters and timers; Part III: Digital voltmeters and multimeters; Part IV: IEC Bus Interface), which proved so popular with readers that each part of the course has been issued in booklet form.

Info-dienst für Ihren Erfahrungsaustausch

Info-dienst (nur in Deutschland) ist eine Publikation der Philips GmbH Unternehmensbereich für Elektronik für Wissenschaft und Industrie für die jetzigen Besitzer und potentiellen Kunden von Philips T & M-Geräten. Dieses Blatt strebt einen effektieven Informationsaustausch auf dem T & M-Gebiet zwischen Hersteller und Anwender sowie **umgekehrt an.**

Neben diesen **Info-dienst** geben wir auch die **T & M Reports** heraus (nur in englischer Sprache), in denen (im allgemeinen längere) Artikel mehr spezieller bzw. theoretischer Art als Ergänzung zu den Informationen in **Info-dienst** stehen. Diese Reports, an denen in allgemeinen nur Spezialisten interessiert sind, werden an eine begrenzte Anwendergruppe verteilt. Jeder, der daran interessiert ist, kann sie auf Anfrage erhalten.

Eine spezielle Serie, die gerade in den T & M News Supplements erschienen ist, war unser Digital Instrument Course (Teil I: Basic binary theory and logic circuits; Teil II: Digital counters and timers; Teil III: Digital voltmeters and multimeters; Teil IV: IEC Bus Interface). Diese Serie war bei den Lesern so populär, daß jeder Teil von diesem Kursus auch in Buchform herausgegeben wurde (nur in englischer Sprache).

T & M Informations est notre moyen de communiquer mutuellement

T & M Informations est une publication de département de Mesure de Philips, destinée aux utilisateurs effectifs et un puissance d'appareils d'essai et de mesure Philips. Elle constitue un moyen efficace de transmettre de l'information dans ce domaine, aussi bien du fabricant vers le client que **vice versa.**

A part la publication **T & M Informations proprement dite,** nous diffusons les **T & M Reports** (seulement en anglais) qui contiennent des articles (généralement plus longs) de nature plus spécialisée ou plus théorique, destinés à compléter l'information donnée dans **T & M Informations.** Etant donné leur nature, ces Reports ne sont généralement envoyés qu'à un cercle plus restreint d'utilisateurs; toutefois, quiconque s'y intéresse peut les obtenir sur demande.

Nous venons de publier dans les T & M News Supplements une série spéciale d'articles qui constituent un cours sur les instruments numériques (1ère partie: Théorie binaire de base et circuits logiques; 2ème partie: Compteurs numériques et minuteries; 3ème partie: voltmètres et multimètres numériques; 4ème partie: IEC Bus Interface) qui a rencontré un tel succés auprès des lecteurs que chaque partie du cours a été réimprimée sous forme de livret (seulement en anglais).

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OPTIONS FOR THE LOGIC SCOPE'S PM 3542 AND PM 3543

- RS 232 C serial and audio-casette interface PM 8842/20 and PM 8843/20
- RS 232 C serial and audio-casette interface and disassembler package PM 8842/60 and PM 8843/60

OPERATING MANUAL

IMPORTANT

In correspondence concerning this instrument, please quote the type number and serial number as given on the type plate and the Software Identification Code.

NOTE: The design of this instrument is subject to continuous development and improvement. Consequently, this instrument may incorporate minor changes in detail from the information contained in this manual.

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CONTENTS

1. GENERAL INFORMATION

1.1. Introduction
1.2. Type numbers
1.3. Selection procedure
1.4. Software Identification Code and prom checking

2. RS 232 C SERIAL AND AUDIO CASETTE INTERFACE

2.1. Introduction RS 232 C serial interface
2.2. Introduction audio casette interface
2.3 Characteristics
2.3.1. RS 232 C serial interface
2.3.2. Audio casette interface
2.3.3. Accessories
2.3.4. Connections
2.4. Directions for use
2.4.1. RS 232 C serial interface
2.4.1.1. Connections
2.4.1.2. Operating instructions
2.4.1.3. Peripherals
2.4.2. Audio casette interface
2.4.2.1. Connections
2.4.2.2. Operating instructions
2.4.2.3. Peripherals

3. DISASSEMBLY PACKAGE

3.1. Introduction
3.2. Characteristics
3.3. Directions for use
3.3.1. Operating instructions
3.3.2. Display messages
3.3.3. 6800 6802 6808
3.3.4. 8048 family
3.3.5. 8080
3.3.6. 8085
3.3.7. IEC 625
3.3.8. 6502 6512
3.3.9. Z80

4. MECHANICAL PARTS AND INSTALLATION

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1. GENERAL INFORMATION

1.1. Introduction

The analyzing power of the Logic Scope's PM 3542 and PM 3543 can be improved by three options:
- RS 232 C serial and audio casette interface
- IEC 625 (IEE 488) parallel interface
- Disassembly package

The RS 232 C serial and audio cassette interface is essentially a dump/load interface where either the full set-up information and captured data can be dumped or loaded. A very usefull feature of a built-in serial interface is that the captured data and set-up information can be listed in different formats by a printer. In addition this interface has an audio casette input/output capability for low cost data storage and retrieval.

The IEC 625 (IEE 488) parallel interface makes the PM 3542 and PM 3543 fully programmable instruments. They can act as listeners, for set-up information, reference memory loading, in fact, all front panel control settings, and talkers to give captured data output to computer based controllers for detailled analysis. This parallel interface will be available in september 1981.
The optional disassembly package is available with either the IEC or RS 232 C interface. It contains the disassembler program and mnemonic codes for the most popular 8-bit uP and uC as standard and can further extended to cover 16-bit uP's as well.
This package also contains a hardware programmable uP adaptorclip which enables rapid connections to be made to all the supported processors without additional expense.

1.2. Type numbers

The options RS 232 C serial and audio cassette interface, IEC 625 parallel interface and the disassembly package A are available in four combinations. These options can be either factory fitted or if required can be ordered and installed at any time.
Disassembly package B, covering other popular microprocessors, will be available in november 1981.
The type numbers of options which can be ordered at any time:

- PM 8842/20 and PM 8843/20 RS 332 C serial and audio cassette interface
- PM 8842/40 and PM 8843/40 IEC 625 parallel interface (available sept. 1981)
- PM 8842/60A and PM 8843/60A RS 232 C serial and audio cassette interface and disassembly package A.
- PM 8842/80A and PM 8843/80A IEC 625 parallel interface and disassembly package A (available sept. 1981)

The type number of Logic Scope with built-in options:

- PM 3542/00 and PM 3543/00 standard Logic Scope
- PM 3542/20 and PM 3543/20 Logic Scope with RS 232 C serial and audio cassette interface.
- PM 3542/40 and PM 3543/40 Logic Scope with IEC 625 parallel interface (available sept. 1981)
- PM 3542/60A and PM 3543/60A Logic Scope with RS 232 C serial and audio interface and disassembly package A.
- PM 3542/80A and PM 3543/80A Logic Scope with IEC 625 parallel interface and disassembly package A (available sept. 1981)

The mechanical parts of the options are listed in chapter 4.

1.3. Selection procedure

A built-in option can be selected in the special menu which is displayed on the screen if the push-buttons SPECL and MENU are depressed. By positioning the flashing cursor on the sign "=" before the special function to be selected, and pressing EXCH/X that special function is selected and displayed in the heading on the screen.

More detailed information is given in chapters 2.4. and 3.3.

1.4. Software Identification Code and prom checking

The Software Identification Code is used to identify the software content of the Logic Scope. The software is devided over a maximum of six prom's.

Software	Prom number
Basic Instrument	A, B
Optional Disassembly package	C, D, E, F
Optional RS 232 C serial and audio cassette interface	G, H
Optional IEC 625 parallel interface	G, H

When the service test program is selected, by pressing DECR and START, holding ROLL tumbler switch up, the Software Identification Code is displayed on the screen, after the uP has tested whether:

1. the "memory extension" board (Prom's C, D, E and F) and an interface board are built-in, and whether

2. the built-in interface is an RS 232 C serial and audio cassette interface or an IEC 625 parallel interface.

Structure of the code:

Example: 4302 - S02 - DA01

43 : type number PM 3543
02 : version number basic instrument software
S02 : RS 232 C serial interface version 02 (P for IEC 625 parallel interface)
DA01 : disassembly package A version 01

Note: the optional disassembly package is devided in package A and package B. Package A is already available; package B will be available in nov. 1981.

When options are built-in "SPECL" is displayed in the heading when pushbutton SPECL is depressed. Next the uP tests, according a testprogram stored in prom G, if the belonging prom H and the interface hardware are built-in.
If no failures occur the I/O (Input/Output) instructions appear in the special menu.
If failures occur two error messages can be displayed:

- "WRONG MEM H" or,

- "WRONG I/O"

After the interface software and hardware are checked the uP checks if the proms C, D, E and F are built-in. These proms contain the disassembly program.
If prom C is not built-in, the disassembly package is not mentioned in the special menu.

Error messages that can occur:

- "WRONG MEM D"

- "WRONG MEM E"

- "WRONG MEM F"

Notice that in all correspondence concerning your Logic Scope the type number, version number and Software Identification Code are mentioned.

2.1 Introduction RS 232 C Serial Interface

The RS 232 C serial interface is used for serial communication between the Logic Scope and other instruments equiped with this interface.
Communication occurs in asynchronous format, which means that framing information must be added to each character.
A character consists of 7-bits of information, representing an ASCII character.
The asynchronous format starts with the basic data to be transmitted and adds a "START" bit to the front of them and a parity bit and 1 or 2 "STOP" bits behind them.
The "START" bit is a logical 0, or space, and is defined as a positive voltage level (+ 12 V) by RS 232 C.
The "STOP" bit is a logical 1, or mark, and is defined as a negative voltage level (- 12 V) by RS 232 C.
The "START" bit tells the receiver to start assembling a character and allows the receiver to synchronize itself with the transmitter.
To each 7-bits, a parity bit is added, which makes the parity even
The parity of a word is the number of 1's in that word.
The receiver checks the parity of each word.
One or two "STOP" bits are added to the end of a character to ensure that the "START" bit of the next character will cause a transition on the communication line.
At the lowest transmittion speeds 110, 150 and 200 baud two "STOP" bits are added to a character.For baud-rates 300, 600, 1200, 2400, 4800 and 9600 only one "STOP" bit is added.
An example of an asynchronous format is given in fig. 2.1.

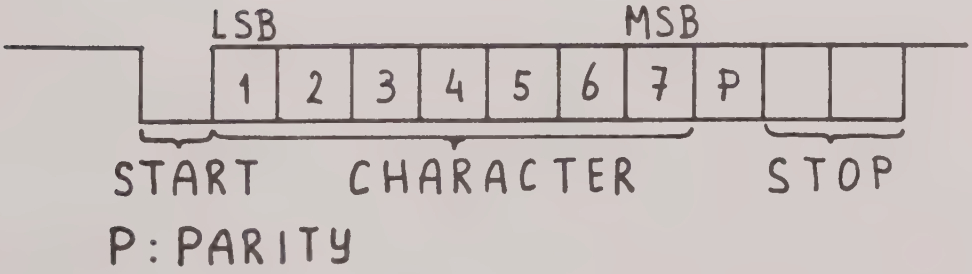


Fig. 2.1. Asynchronous format

2.2. Introduction audio cassette interface

The domestic audio cassette recorder can be used for low-cost data storage.
The data is transmitted by a series of variable lenght tone bursts.
The dominant frequency of the tone used is selected within the passband of a cassette recorder.
Data is transmitted with each bit composed of a tone burst followed by a pause.The first third of a bit period is always a tone burst, the middle third is either a tone burst continuous with the first of a pause corresponding to, respectively, a one or zero, and the final third is always a pause, as shown in fig. 2.2.

Fig. 2.2. Data record format

The audio cassette interface transforms the binary data into a series of variable lenght tone bursts which can be dumped on a cassette recorder.
Before transmitting the information to be dumped, the interface adds a tone burst of approximately 9 seconds to synchronize analyzer and cassette recorder.
After the synchronization burst a file number is added which identifies the information.
Every 16 characters a checksum character is added to detect errors. A character consists of 8-bits. 16 characters are added without carry and the two's complement of this sum is used as a checksum character.
When an analyzer is loaded by a cassette recorder it searches for the sychronisation burst and the selected file number. The analyzer is loaded with the selected file. The one's and zero's are decoded by comparing the tone burst and the pause. If the tone burst is longer than the pause the bit is a one; otherwise it is a zero. Every 16 characters the interface checks the checksum.

2.3. Characteristics

Mechanical parts of the RS 232 C serial and audio cassette interface are listed in chapter 4.

2.3.1. RS 232 C serial communication interface

Operating mode	: Full duplex, asynchronous
Configurations	: in accordance with EIA RS 232 C/CCITT V24
Baud rates	: 110, 150, 200, 300, 600, 1200, 2400, 4800 and 9600. Selectable in the special menu (MENU and SPECL depressed)
Data bits	: 7
Stop bits	: 1 for baud rates: 300, 600, 1200, 2400, 4800, and 9600 2 for baud rates: 110, 150, 200
Parity	: even
Connector	: 25 pin, male; rear side.
Selection	: selected by placing the flashing cursor in the special menu mode (MENU and SPECL depressed) on the equal sign before RS 232 and pressing EXCH/X

2.3.2. Audio cassette interface

Transmittion speed	: approx. 30 characters/sec.
Input voltage analyzer cassette interface	: 2,5 Vpp $\pm$ 0,5 V
Output voltage anylyzer cassette interface	: 2 Vpp $\pm$ 0,5 V
sychronisation	: tone burst of approx. 9 sec.
Filenumber	: selectable in special menu (MENU and SPECL depressed) by placing the flashing cursor on the file number and manupilating the EXECUTE pushbuttons.
Data load	: selectable in special menu by placing flashing cursor on equals before "DATA IN" and pressing EXCH/X
Data Dump	: selectable in special menu by placing flashing cursor on equals sign before "DATA OUT" and pressing EXCH/X
Connector	: 25 pin, male; rear side.

2.3.3. Accessories

Supplied with the option	: 25 p. female connector

2.3.4 Connections

Connector 25 pin, male, rear side of Logic Scope

Pin nr.	RS 232C/V24	Description
1	AA	protective ground
2	BA	T x D, Transmitted Data
3	BB	R x D, Received Data
4	CA	RTS , Request To Send
5	CB	CTS , Clear To Send
6	CC	DSR , Data Set Ready
7	AB	Signal ground
20	CD	DTR , Data Terminal Ready
	Audio casette interface	
12		remote control cassette recorder
13		remote control cassette recorder
16		audio out
18		audio in
19		ground

2.4 Directions for use

2.4.1. RS 232 C serial interface

2.4.1.1. Connections

The state analyzer section of the Logic Scope can, via the RS 232 C serial interface be connected to other equipment provided with this interface.
A printer can be connected to the analyzer to print a list of settings and captured data.
Settings and captured data can also be displayed on a video display unit.
The printer, or video display, must be connected to the 25-p. male connector on the rear side of the Logic Scope.
Fig. 2.3 shows the connections that must be made.

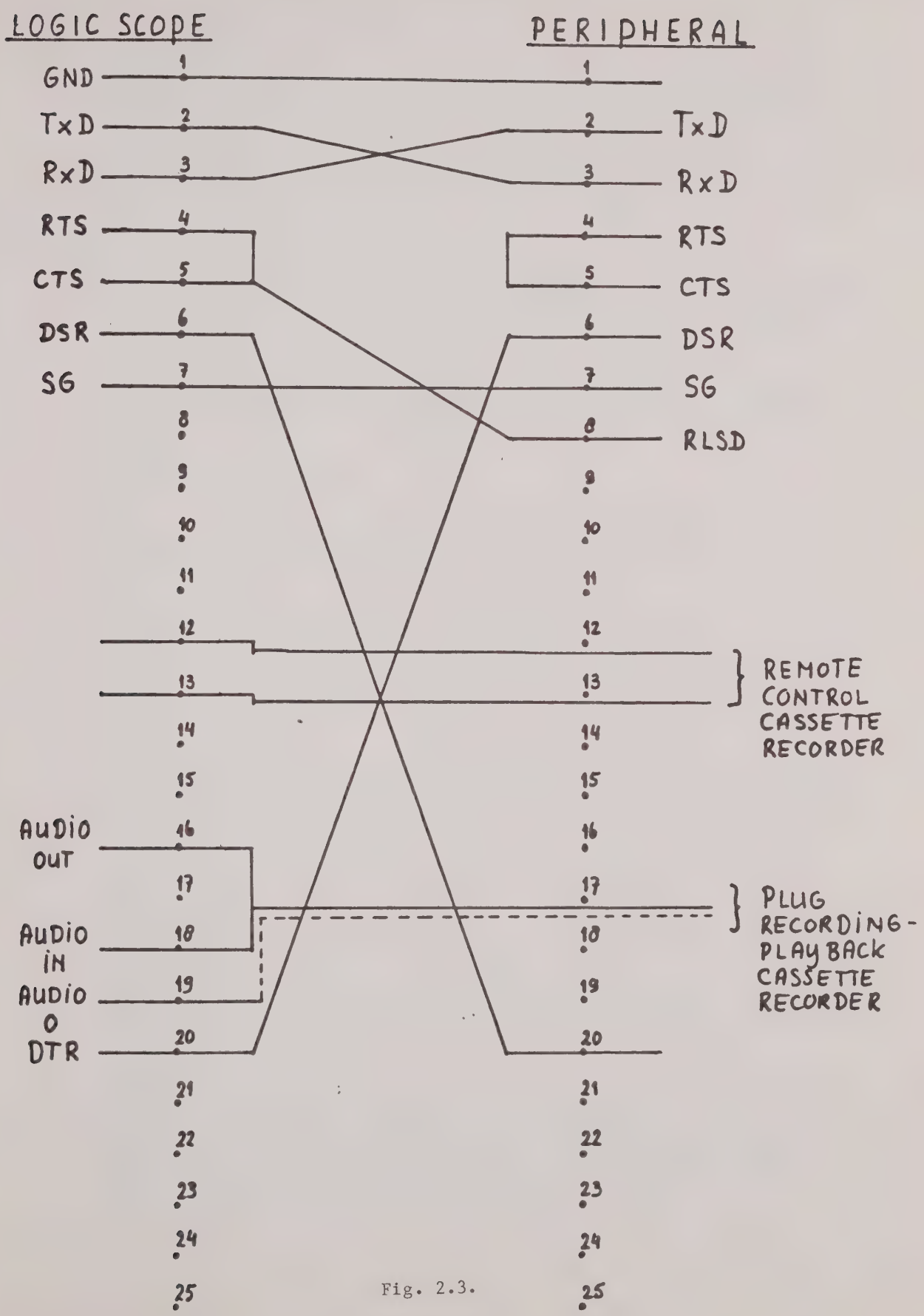
2.4.1.2. Operating instructions

The RS 232 C can be selected by placing the flashing cursor in the special menu (MENU and SPECL depressed) on "=RS 232 C" and pressing EXCH/X. "RS 232 C" starts flashing. By pressing EXCH/X again the function is neutralized.
Behind "DATA OUT" on the screen flashes "PRINT", and in the heading is "SPECL" displayed.
The baud rate can be changed by placing the cursor on " BAUD RATE =" and manipulating the pushbuttons INCR and DECR.
After the parameters are selected the contents of the Data Acquisition Memory of the analyzer can, in serial format be sent to a printer by pressing the pushbutton START/STOP. At first the Software Identification Code and the parameters are printed and after that the stored data.
When the pushbutton DATA is depressed the contents of the Reference Memory is printed instead of the contents of the Data Acquisition Memory.
Data is printed on the same format as it is displayed on the sceen.
Printing can be stopped manual by presing START/STOP.

2.4.1.3. Peripherals

Each printer equiped with an RS 232 C serial interface can be used to print a list of the parameters and data stored in the analyzer.
Examples: Philips PM 4490
EPSON MX 80
FACIT 4520/21
Lear Siegler LSI 310
OKI uLine 80

A video display equiped with an RS 232 C serial interface can be used to extend the diplay size.


LOGIC SCOPE
PERIPHERAL
GND
TxD
RxD
RTS
CTS
DSR
SG
RLSD
REMOTE CONTROL CASSETTE RECORDER
PLUG RECORDING-PLAY BACK CASSETTE RECORDER
AUDIO OUT
AUDIO IN
AUDIO O
DTR
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
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24
25

Fig. 2.3.

2.4.2. Audio cassette interface

2.4.2.1. Connections

The state analyzer of the Logic Scope can, via the audio-cassette interface, be connected to an audio cassette recorder for low cost data storage.
The audio-cassette recorder must be connected to the 25-p. male connector on the rearside of the Logic Scope.
Fig. 2.3. shows the connections that must be made.

2.4.2.2. Operating instructions

The audio cassette interface can be selected in the special menu (MENU and SPECL depressed) by placing the flashing cursor on "=TAPE" and pressing EXCH/X. By pressing EXCH/X again the function is neutralized.
In the heading is displayed "SPECL".
Behind "=DATA IN" is displayed "LOAD" and behind "=DATA OUT", "DUMP".
The file number can be selected by placing the cursor on the file number and manipulating the EXECUTE push-buttons INCR/1, EXCH/X, DECR/0.

Loading from cassette

By placing the cursor on "=DATA IN" and pressing START/STOP the cassette recorder is started.
First the audio cassette interface looks for the synchronization burst.
Behind "DATA IN" is displayed "SEARCHING".
When the synchronization burst is found the file number on the tape is compared with the selected file number on the screen. If they don't match, "SEARCHING" is displayed and the interface starts searching for the next synchronization burst.
If the file numbers match, the heading and the Reference Memory are loaded by tape.
During the load operation the checksum is tested. When the checksum is wrong the load operation is stopped and on the screen, behind "DATA IN" , is displayed "DATA ERROR".
If the heading and the Reference Memory are loaded, behind "DATA IN" is displayed, "COMPLETE".
Loading can be stopped by pressing START/STOP or releasing MENU or SPECL.
When loading has been interrupted "NO DATA" is displayed on the screen.
When the output voltage of the cassette recorder is toohigh "DATA ERROR" is displayed.
When the output vltage of the cassette recorder is toolow the analyzer cannot detect the synchronization burst and "SEARCHING" is displayed.

Dumping on cassette

By placing the cursor on "=DATA OUT" and pressing START/STOP the cassette recorder is started and selected file number, heading and the contents of the Reference Memory are dumped on the cassette.
When the contents of the Reference Memory is completely dumped on tape, then "COMPLETE" is displayed behind "DATA OUT".

2.4.2.3. Peripherals

Every reliable audio cassette recorder can be used for low cost storage of data. However it is recommended to use a cassette recorder provided with a remote control facility otherwhise before every load or dump operation the cassette recorder has to be started manual. Low cost C 60 ferro-cassettes can be used for data storage.

Recommanded: Philips M 2234 cassette recorder.

3. DISASSEMLY PACKAGE

3.1. Introduction

The disassembly package A is available with the RS 232 serial and audio cassette interface and will be available with the IEC 625 parallel interface.
The advantage of this disassebly package is that is consists of a main disassembly program, covering the most popular microprocessors, that works in conjunction with an instruction-set library. This contrasts with the more expensive solution of individual personality modules for each processor.
If a disassembler is selected the sampling conditions are automatically set.
The disassembly program disassembles the captured data, addresses, mnemonic codes and data are displayed on the screen.
To distinguish data and op-codes (operating codes) in the captured stream of data a sychronization program is used, which differs for each type of microprocessor.
Analyzing the 6800/2/8 or 8048 family microprocessors it is possible that synchronization can not be found automatically. In that case synchronization can be obtained manually by selecting the relative "DISM" program.
The contents of the disassembly package for the PM 3542 differs from the package for the PM 3543

3.2 Characteristics

Microprocessors covered by PM 8842/60A or PM 8842/80A	: 8048 family 8080 8085 IEC 625
Microprocessors covered by PM 8843/60A or PM 8843/80A	: 6800/2/8 8048 family 8080 8085 IEC 625 6502/12 Z80
Automatic synchronization	: 8080 8085 IEC 625 6502/12 Z80
Manual or automatic synchronization	: 6800/2/8 8048 family

Selection : selected by placing the flashing cursor in the special menu mode (MENU and SPECL depressed) on the equal sign before the desired DISA or DISM and pressing EXCH/X.

Sampling conditions : automatically set when a disassembly program is selected

Connections

	Pod 2							
	7	6	5	4	3	2	1	0
Type	CK0	CK1	Q0	Q1	Q2	IO/M	-	-
8085	ALE	RD	HLDA	S0	S1	-	-	-
Z80	MREQ	IORQ	RFSH	M1	RD	-	-	-
8080	SYNC	DBIN	M1	HLDA	-	-	-	-
6800/2/8	Ø2	Ø2	VMA	R/W	-	-	-	-
8048 fam.	ALE	PSEM	-	-	-	-	-	-
6502/12	Ø2	Ø2	R/W	READY	SYNC		-	-
IEC 625	NDAC	EOI	-	ATN	EOI	IFC	REN	SRQ

Accessories supplied with the option: PM 8818 Programmable uP adaptor clip 40p. IC clip, flat cable and connector

3.3. Directions for use

3.3.1. Operating instructions

The disassembly programs can be selected in the special menu (MENU and SPECL depressed) by placing the flashing cursor on "= DISA ..." or "= DISM.." and pressing EXCH/X.
The word "SPECL" in the heading is replaced by the selected disassembly program. If EXCH/X is pressed again the disassembler is neutralized.
By releasing MENU the op-codes on the screen are translated into mnemonic codes.
When a disassembly program with manual sychronization is selected the operater must enter the synchronization point, i.e. an op-code .
The op-code which will be used for synchronization must be placed at the top of the displayed data on the screen.
The data captured before the op-code used for manual synchronization cannot be disassembled.
This data can be disassembled by selecting an "earlier" captured op-code as synchronization point. Two ways are possible:

- position the desired synchronization op-code on the top line on the screen. The desired disassembly program has to be selected again by placing the cursor in the special menu (MENU and SPECL depressed) on the equals before the desired disassembler and pressing EXCH/X.
- position the desired synchronization op-code on the top line on the screen and pressing RCL by which a synchronization op-code is selected.

3.3.2. Display messages

"***"	Synchronization is lost. It is not clear if this word is an op-code or data.
"ILLEGAL"	A byte marked as an op-code doesnot exist for the selected type microprocessor.
"---"	Not clear if this word is an opcode f.e. because there are not enough words in the Data Acquisition Memory.

3.3.3. 6800 6802 6808

Connections
PM 3543

Pod 2 :		6800	6802/8
7	CK0	PHI 2	E
6	CK1	PHI 2	E
5	Q0	R/W	R/W
4	Q1	VMA	VMA
3	Q2	BUSACKN	BUSACKN
2		A 10	A 10
1		A 9	A 9
0		A 8	A 8
Pod 1 :			
7...0		A7...A0	A7...A0
Pod 0 :			
7...0		D7...D0	D7...D0

Clock and clock-qualifier setting:
CK0. Q0. Q1. Q2. = 0110
CK1. Q0. Q1. Q2. = 0010
These settings are automatically made when "=DISE 6800/2/8" is selected and cannot be changed by the user.

Display
The instruction op-codes are captured with CK0, therefore the mnemonic codes are displayed in column "CK0".
Clock CK1 captures write cyclus (address and data).
In the sequential display mode the captured write address is displayed.

Interrupts and DMA
The interrupts "RESET", "IRG" and "NMI" are distinguished and indicated.
If not enough data is captured to make a distinction "UNINT" (UNidentified INTerrupt) is displayed.
DMA cycles are ignored by means of the clock-qualifier BUSACKN

Special conditions
When no automatic synchronization is achieved ("xxx" displayed instead of mnemonics) manual synchronization can be used by selecting " = DISM 6800/2/8"

3.3.4. 8048 Family

Connections

PM 3543 Pod 2 :		8048
7	CK0	ALE
6	CK1	PSEM
5	Q0	-
4	Q1	-
3	Q2	-
2		-
1		-
0		-
Pod 1 :		
7...0		-
3...0		P23...P20
Pod 1 :		
7...0		DB7...DB0

PM 3542 Pod 2 :		8048
7	CK0	ALE
6	CK1	PSEM
5	Q0	-
4	Q1	-
3	Q2	P23
2		P22
1		P21
0		P20
Pod 1 :		
7...0		DB7...DB0

Clock and clockqualifier setting

CK0. Q0. Q1. Q2 = 0xxx
CK1. Q0. Q1. Q2 = 1xxx
These settings are automatically made when "= DISA 8048 FAM" is selected and cannot be changed by the user.

Display

Op-codes are captured with CK1, so in that column are the mnemonics displayed on the screen.
Addresses are captured with CK0.

Interrupts and DMA

Interrupts are indicated by "INT" behind the data where the interrupt is detected by the LSA.
DMA doesnot exist.

Special conditions

When no automatic synchronization is achieved ("xxx" displayed instead of mnemonics) manual synchronization can be used by selecting " = DISM 8048 FAM".
Remember that only a program stored in external ROM can be disassembled.
When the microprocessor is occupied with internal operations, the address bus is high impedance, so data captured from the address bus contains no information. Data captured with CK1 and Pod1 is identical with data captured with CK0 on Pod1 and is not displayed.

3.3.5. 8080

Connections

PM 3543			PM 3542		
Pod 2 :		8080	Pod 2 :		8080
7	CK0	SYNC	7	CK0	SYNC
6	CK1	DBIN	6	CK1	DBIN
5	Q0	M 1	5	Q0	M 1
4	Q1	HLDA	4	Q1	HLDA
3	Q2	A 11	3	Q2	A 3
2		A 10	2		A 2
1		A 9	1		A 1
0		A 8	0		A 0
Pod 1 :			Pod 1 :		
7...0		A7...A0	7...0		D7...D0
Pod 0 :					
7...0		D7...D0			

Clock and clockqualifier setting

CK0. Q0. Q1. Q2. = 010x
CK1. Q0. Q1. Q2. = 0x0x
These settings are automatically mode when " = DISA 8080" is selected and cannot be changed by the user.

Display

Op-codes are captured with CK1 and therefore displayed in column "CK1".
The status signals used in the disassembly program and the high order addresses are captured with CK0.

Interrupts and DMA

Interrupts are indicated by "INT" on the screen. DMA cyclus are ignored by means of clock-qualifier HLDA.

Special conditions

Only 1 nibble (= 4-bits) of the high order address can be captured. (PM 3543).

3.3.6. 8085

Connections

PM 3543			PM 3542		
Pd 2 :		8085	Pod 2 :		8085
7	CK0	ALE	7	CK0	ALE
6	CK1	RD	6	CK1	RD
5	Q0	HLDA	5	Q0	HLDA
4	Q1	S0	4	Q1	S0
3	Q2	S1	3	Q2	S1
2		-	2		IO/M
1		-	1		A 9
0		-	0		A 8
Pod 1 :			Pod 1 :		
7...0		A15...A8	7...0		AD7...AD0
Pod 0 :					
7...0		AD7...AD0			

Clock and clockqualifier settings

CK0. Q0. Q1. Q2. = 00xx
CK1. Q0. Q1. Q2. = 10xx
These settings are automatically made when " = DISA 8085" is selected and cannot be changed by the user.

Display

Op-codes are captured with CK1 and therefore displayed in column "CK1". Address and status are captured wtih CK0.

Interrupts and DMA

The interrupts "TRAP", "INTR", "RST 5,5", RST 6,5" and "RST 7,5" are distinguished and indicated.
If not enough data is captured to make a distinction "UNINT" (UNidentified INTerrupt) is displayed.
DMA cycles are ignored by means of the clock-qualifier HLDA.

Special conditions

Data captured with CK1 on Pod 1 is left out because it is identical data captured with CK0 on Pod 1 (PM 3543).
Only read data is captured

3.3.7. IEC 625

Connections
PM 3543 and PM 3542

Pod 2 :		IEC bua
7	CK0	NDAC
6	CK1	EOI
5	Q0	-
4	Q1	ATN
3	Q2	EOI
2		IFC
1		REN
0		SRQ
Pod 1 :		
7...0		DIO7...DIO0
Pod 0 :		
7...0		-

Clock and clockqualifier settings
CK0. Q0. Q1. Q2 = 1xxx
CK1. Q0. Q1. Q2 = 1x0x
These settings are automatically made when " = DIS A IEC 625" is selected. Troublefree operation of the disassembly program is not quaranteen when these settings are changed. Q0 and Q2 can be changed.

Display
Messages are captured with CK0.
The parallel poll message is captured with CK1.
The display becomes the following lay-out:

LINE NO	POD # 2	# 1 HEX	DEC	ASC	MNEMON	DATA AEIRS	CK

Column	Description
LINE NO	Line number (see operating manual PM 3543/42)
POD # 2	Data captured on inputs 0...4 of pod 2.
POD # 1	Data captured on pod 1 is displayed in four configurations: HEX, DEC, ASC and MNEMON
HEX	The captured data is inverted and represented in hexadecimal code
DEC	Decimal code of the captured data.
ASC	ASCII code of the captured data.
MNEMON	Mnemonic code of the captured data.
AEIRS	Data captured on inputs 0...4 of pod 2. This column is used to indicate: ATN : "A" displayed EOI : "E" displayed IFC : "I" displayed REN : "R" displayed SRQ : "S" displayed
CK	When data is captured with CK1 in this column is displayed: " # 1 ".

Special conditions

- The disassembly program operates only if the sequential display mode is selected (SEQ, DISPLAY section, depressed).
- If push-button TRIGW is used the triggerwords get the non-inverted value of the word displayed at the top of the column HEX

3.3.8. 6502 6512

Connections

PM 3543 Pod 2 :		6502/12
7	CK0	PHI 2
6	CK1	PHI 2
5	Q0	R/W
4	Q1	RDY
3	Q2	SYNC
2		AB 10
1		AB 9
0		AB 8
Pod 1 :		
7...0		AB7...AB0
Pod 0 :		
7...0		DB7...DB0

Clock and clock-qualifier settings

CK0. Q0. Q1. Q2 = 011x
CK1. Q0. Q1. Q2 = 00xx
These settings are automatically made when " = DISA 6502/12" is selected and cannot be changed by the user.

Display

Op-codes are captured with CK0 and therefore displayed in column "CK0"
Addresses are captured with CK1.

Interrupts and DMA

The interrupts "NMI", "IRQ" and "RST" are distinguished and indicated. When not enough data is captured to make a distinction "UNINT" (UNidentified INTerrupt) is displayed.
DMA cycles are ignored by means of the clock-qualifier RDY.

Special conditions

- If the clock-qualifier signal RDY isnot used in the system under test this clock-qualifier must be connected to logic level 1. The RDY signal in the system under test can be used if it only changes state during the first phase of the microprocessorclock.
- Only three bits of the high order address byte are captured. The three bits are together with the synchronization signal represented as a hexadecimal code. Consequently if the right address is desired 8 (sync = 1) must be subtacted from the hexadecimal code.
- To display the complete captured address part of the write cycle sequential display made must be selected.

3.3.9. Z80

Connections

PM 3543 Pod 2 :		Z80
7	CK0	MREQ
6	CK1	IOREQ
5	Q0	RFSH
4	Q1	M 1
3	Q2	RD
2		A 10
1		A 9
0		A 8
Pod 1 :		
7...0		A7...A0
Pod 0 :		
7...0		D7...D0

Clock and clockqualifier settings

CK0. Q0. Q1. Q2 = 11xx
CK1. Q0. Q1. Q2 = 11xx
These settings are automatically made when " = DISA Z80" is selected and cannot be changed by the user.

Display

Op-codes are captured with CK0 and therefore displayed in the column "CK0". Addresses are displayed before the op-codes and data captured with CK0. I/O cycles and interrupts are captured with CK1.

Interrupts and DMA

Interrupts are indicated by "INT" on the screen; different types of interrupts cannot be distinguished from eachother with exception of the non maskable interrupt "NMI" which is indicated on the screen. DMA cycles are not captured, unless in the system under test the IOREQ signal is connected to a DMA read or write puls. In that case the DMA cycles are displayed in the column "CK1", and not distinguished from an I/O cycle.

Special conditions

- The three high order address line, added with the RD line, are represented as a hexadecimal code. Consequently if the right address is desired 8 must be subtracted from the hexadecimal code, in case of RD = 1 (i.e. a write cycle).
- Prefixes are indicated on the screen by "PRFX".

RS 232 C serial and audio cassette interface

This option can either be factory fitted or installed at any time.
PM 3542/20 and PM 3543/20 Logic Scope with this option factory fitted.
PM 8842/20 and PM 8843/20 RS 232 C serial and audio cassette interface which can be installed at any time.
This option consists of the following parts:

- Memory extension board provided with prom G. Jumper g in the same position as drawn in figure 4.1.
- serial and audio cassette interface board.
- two flat cables and connectors to connect the memory extension board with the LSA board.
- cable and connector to connect the memory extension board with the interface oscilloscope board.
- flat cable and 25p. connector which must be connected to the rear side of the Logic Scope. The flat cable must be fed between the metal screen and the soldering side of the supply print to the position where the 25p. connector must be fitted.

RS 232 C serial and audio cassette interface and disassembly package A

This option can either be factory fitted or installed at any time.
PM 3542/60 and PM 3543/60 Logic Scope with this option factory fitted.
PM 8842/60 and PM 8843/60 RS 232 C serial and audio cassette interface which can be installed at any time.
This option consists of the following points:

- memory extension board
  PM 3543/60 and PM 8843/60: provided with proms C, D, E, F and G.
  Jumpers as drawn in figure 4.1.
  PM 3542/60 and PM 8842/60: provided with proms C, D, E, and G.
  Jumper C to the left position
  Other jumpers as drawn in figure 4.1.
- serial and audio cassette interface board.
- two flat cables and connectors to connect the memory extension board with the LSA board.
- cable and connector to connect the memory extension board with the interface board.
- flat cable and 25 p. connector which must be connected to the rear-side of the Logic Scope. The flat cable must be fed between the metal screen and the back of the power supply print to the position where the 25 p. connector must be fitted.

With this option a PM 8818 hardware programmable uP adaptor clip with flat cable and 40 p. IC clip is delivered.

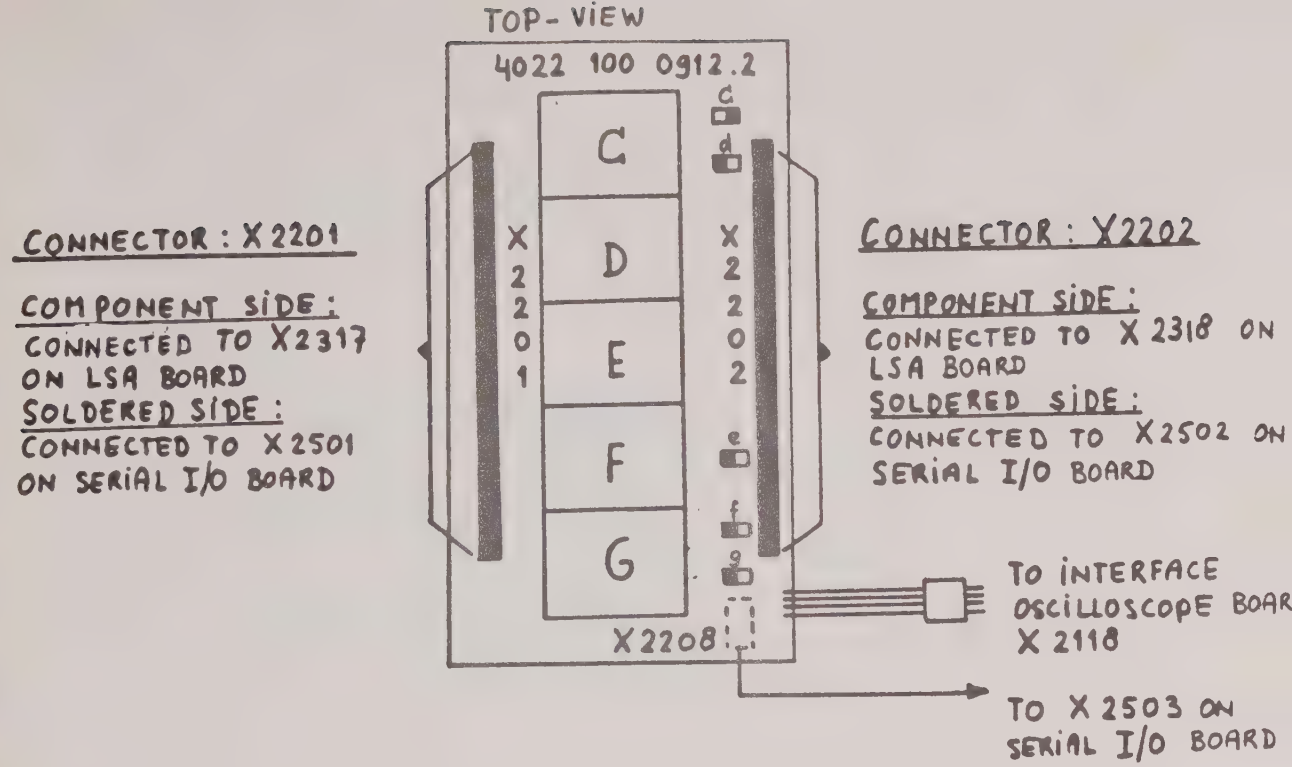

Fig 4.1. memory extension board

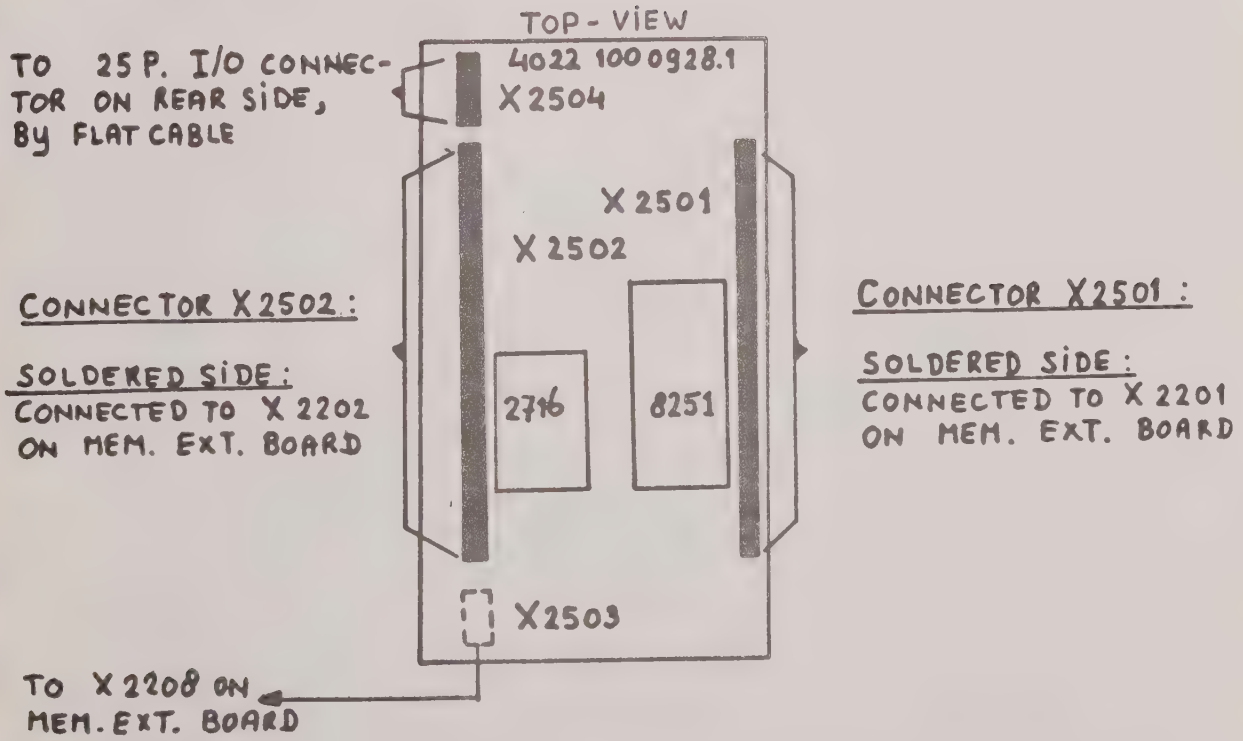

Fig. 4.2. RS 232 C serial and audio cassette interface board

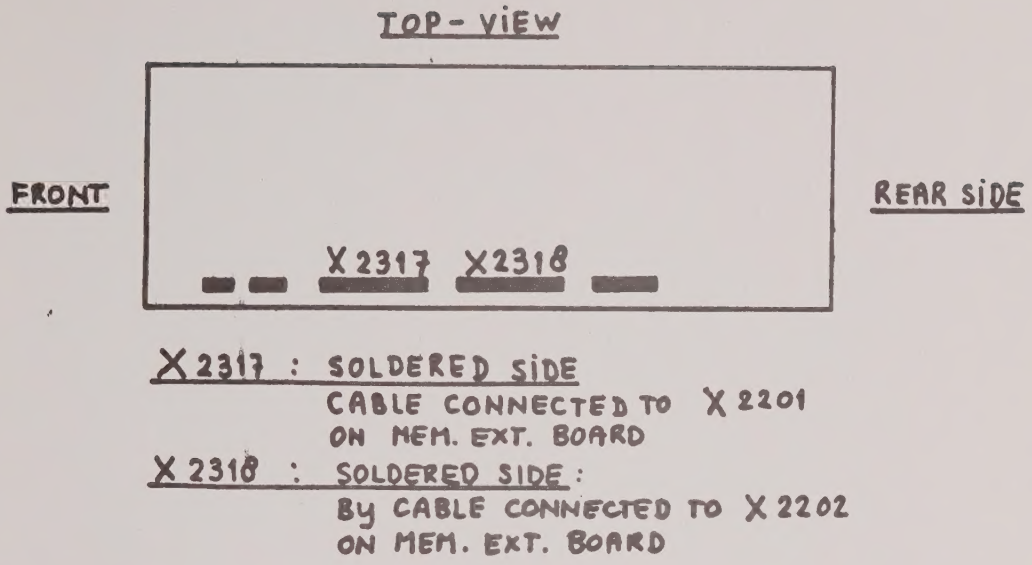

Fig. 4.3. LSA board

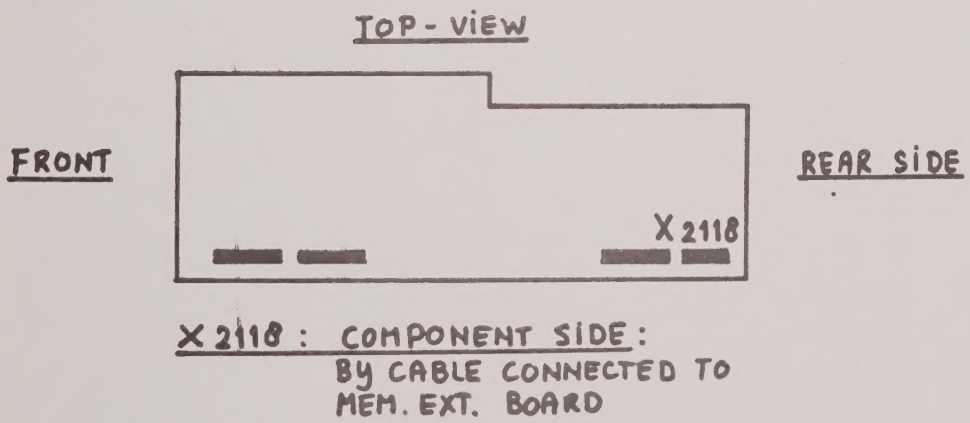

Fig. 4.4. Interface oscilloscope board

MP MASTER
MA24612